



November 10, 2021

Ms. Pauline Block  
Cornerstone Properties  
1435 North McDowell Boulevard, Suite 110  
Petaluma, CA 94954

## **DRAFT Queuing Analysis for 5400 Old Redwood Highway North**

Dear Ms. Block;

As requested, W-Trans has prepared a queuing analysis to assess the circulation impacts of events held at 5400 Old Redwood Highway North in the County of Sonoma. The purpose of this letter is to provide the results of our analysis of event-related traffic and the capacity of the turn lane to accommodate southbound left-turning traffic at the project driveway.

### **Background**

The queuing analysis is based on existing conditions at 5400 Old Redwood Highway North. Currently, the site's largest traffic volumes are associated with events that include a retail marketplace and food trucks; events are generally held on the first Saturday of the month from 11:00 a.m. to 4:00 p.m. The City of Petaluma staff is evaluating the potential annexation of the site and staff expressed concern about the potential traffic impacts associated with monthly events, particularly the adequacy of the center turn lane to accommodate southbound left-turning vehicles at the project driveway.

### **Site Access**

The project site is accessed via the existing driveway on Old Redwood Highway North. South of the driveway, the roadway includes two through lanes in each direction and a two-way left-turn lane (TWLTL); it is noted that the northbound lanes merge into one lane in front of the project driveway. The roadway is about 60 to 65 feet wide along the project frontage and has a posted speed limit of 40 miles per hour (mph). There is approximately 80 feet of stacking space in the TWLTL for southbound drivers turning left into the project site; north of this point, the center lane is a left-turn-only lane for northbound traffic approaching the North McDowell Road intersection.

### **Sight Distance**

Sight distances along Old Redwood Highway North at the project access point were field measured and evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distances for minor street approaches that are either a private road or a driveway are based on stopping sight distance with approach travel speed used as the basis for determining the recommended sight distance.

For the posted 40-mph speed limit, the minimum stopping sight distance needed is 300 feet. Based on a review of field conditions, sight lines to and from the project driveway location on Old Redwood Highway North extend 400 feet or more in each direction, which exceeds Caltrans' minimum criteria. Additionally, adequate stopping sight distances are available for following drivers to notice and react to a preceding motorist slowing to turn right into the driveway. Southbound left turns would be accommodated in the TWLTL, so the flow of through traffic would not be impacted by these movements.

## Queuing Analysis

The volume of inbound and outbound traffic at the project driveway was counted during a monthly event that took place from 11:00 a.m. to 4:00 p.m. on Saturday, October 2, 2021. Based on the collected counts, the peak hour was determined to be between 12:00 p.m. and 1:00 p.m.

Queuing in the southbound left-turn lane on Old Redwood Highway North at the project driveway was evaluated to determine if the existing storage lengths would be adequate for the maximum anticipated queues upon redevelopment. The two-way stop-controlled intersection queuing methodology developed by the Oregon Department of Transportation is the most current widely-used methodology available. During the peak hour of 12:00 p.m. to 1:00 p.m., there were 206 inbound and outbound trips at the project driveway, including 37 southbound left-turning vehicles. A summary of the traffic counts is enclosed.

Applying a conservative approach, queuing at the project driveway for the Saturday event was analyzed by assuming that the traffic volumes along Old Redwood Highway North were at weekday peak hour levels as this reflects worst-case conditions. Volumes posted on the County of Sonoma website were collected between March 13, 2017, and March 15, 2017. Based on the number of vehicles entering and exiting the driveway and the estimated volumes on Old Redwood Highway North, the maximum queue was determined to be 50 feet (two vehicles) based on a.m. peak hour volumes and 75 feet (three vehicles) based on p.m. peak hour volumes. Therefore, the existing stacking length of 80 feet at the driveway is adequate to accommodate estimated queuing under these conditions. As noted, worst-case traffic conditions during the peak commute period were assumed. Weekend traffic volumes are typically lower than weekday volumes; this would likely be more pronounced near the project site, which is located adjacent to a business park that generates few trips on weekends. Copies of the queuing calculations are enclosed.

To confirm the calculations, queuing was also observed in the field during the October 2<sup>nd</sup> event, from 12:40 p.m. until 1:40 p.m. No more than one car making a southbound left turn was observed queuing in the TWLTL at the project driveway and no conflicts were seen between inbound and outbound vehicles. Frequent traffic gaps were observed on Old Redwood Highway North, allowing drivers to enter or exit the site without waiting for a long period of time. The finding that the observed queue lengths were shorter than the calculated lengths is consistent with what would be expected, as the latter were based on the higher weekday peak period traffic volumes. Based on the calculations and field observations, the existing queuing capacity for southbound left-turns is adequate to accommodate event-related volumes.

## Conclusions

- Based on collected traffic counts, there were 206 inbound and outbound trips during the peak hour at a Saturday event. This included 37 southbound left-turning vehicles.
- Adequate sight distances are available at the project driveway.
- Conservatively assuming that weekday peak hour traffic levels would be present, a queuing analysis indicates that the TWLTL has adequate stacking capacity to accommodate the maximum anticipated queue of three southbound left-turning vehicles. The calculations were supported by field observations.

We hope the above information is useful in moving forward with the proposed annexation and development project. Please call if you have any questions.

Sincerely,

Jade Kim  
Assistant Planner

Barry Bergman, AICP  
Senior Planner

Dalene J. Whitlock, PE, PTOE  
Senior Principal

DJW/bdb-jk/PET242.L1

Enclosures: Traffic Counts, Queuing Calculations

DRAFT

## Volume

**Location:** Redwood Hwy & 5400 Old Redwood Hwy Dwy/Harmony Farm Supply & Nursery Dwy

**City:** Petaluma

**Date:** 10/2/2021

**Day:** Saturday

TIME	In		Out		TOTAL
	NR	SL	WL	WR	
11:00 AM	19	4	4	4	<b>31</b>
11:15 AM	20	8	2	8	<b>38</b>
11:30 AM	18	9	7	7	<b>41</b>
11:45 AM	22	3	12	7	<b>44</b>
12:00 PM	16	9	18	11	<b>54</b>
12:15 PM	17	6	8	14	<b>45</b>
12:30 PM	17	13	19	13	<b>62</b>
12:45 PM	15	9	10	11	<b>45</b>
1:00 PM	14	5	18	14	<b>51</b>
1:15 PM	15	7	14	12	<b>48</b>
1:30 PM	9	6	15	5	<b>35</b>
1:45 PM	20	3	11	4	<b>38</b>
2:00 PM	16	7	17	10	<b>50</b>
2:15 PM	9	3	15	13	<b>40</b>
2:30 PM	22	7	9	10	<b>48</b>
2:45 PM	9	4	9	13	<b>35</b>
3:00 PM	4	4	1	9	<b>18</b>
3:15 PM	8	1	4	5	<b>18</b>
3:30 PM	4	5	5	7	<b>21</b>
3:45 PM	7	0	3	5	<b>15</b>
<b>Totals</b>	<b>281</b>	<b>113</b>	<b>201</b>	<b>182</b>	<b>777</b>

## Queue Length Estimation at Two-Way STOP Controlled Intersection

### Project Information

Analyst:	W-Trans	Agency/Co.:	City of Petaluma
Analysis Time Period:	Existing AM	Project ID:	PET242
Date Performed:	10/25/2021	Scenario	AM Existing + Project
Jurisdiction:	City of Petaluma		
Intersection:	Old Redwood Highway/Project Driveway		
East/West Street:	Project Driveway		
North/South Street:	Old Redwood Highway		

### Instructions

Step 1 Input Volumes on **Volumes** sheet

Lane Group Code :	MJL	1	Major street separate left turn lane / TWLT
	MNLTR	2	Minor street shared left, through and right lane
	MNLR	3	Minor street shared left, and right lane
	MNL	4	Minor street separate left turn lane
	MNR	5	Minor street separate right turn lane

Step 2 Calculate Input Parameters

- Calculate Lane Group Volumes, % Heavy Vehicles, and Conflicting Volumes (2.0% default)
- Identify the presence of an upstream signal within 1/4 mile on major approaches (Signal, 0 default)
- Identify the presence of a separate LT lane / TWLT on major street approaches (LT, 1 default)
- Verify the input ranges to feed into the models (see QueueLengthsModels sheet)

Step 3 **Obtain** queue lengths in feet from **Results** column

**Note:** *Round off queue lengths to the next highest 25 feet when reporting*

Input							Results
Approach	Lane Group, Code	Volume, veh/hr	% Heavy Vehicles	Conflicting Volume, veh/hr	Signal (0 or 1)	Left Turn Lane (0 or 1)	Queue Length Feet
EB	MNLTR	0					
EB	MNLR	0					
EB	MNL	0					
EB	MNR	0					
WB	MNLTR	104	2.0%	2751	0	1	<b>100</b>
WB	MNLR	104	2.0%	1597	0	1	<b>100</b>
WB	MNL	55	2.0%	1154	0	1	<b>100</b>
WB	MNR	49	2.0%	443	0	1	<b>75</b>
NB	MJL	0					
SB	MJL	37	2.0%	475	0	1	<b>50</b>

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EB	MNLR	0					
EB	MNL	0					
EB	MNR	0					
WB	MNLTR	104	2.0%	3531	0	1	<b>100</b>
WB	MNLR	104	2.0%	2195	0	1	<b>100</b>
WB	MNL	55	2.0%	1336	0	1	<b>125</b>
WB	MNR	49	2.0%	859	0	1	<b>100</b>
NB	MJL	0					
SB	MJL	37	2.0%	891	0	1	<b>75</b>